THE RELATIONSHIP BETWEEN STOCK MARKET RETURNS AND DIVIDEND YIELDS IN SRI LANKA

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Abstract

This paper examines the ability of dividend yields to predict expected stock returns in the Colombo Stock Exchange in the 1989-1997 period. The results show that dividend yields predict expected returns reliably in return horizons up to three years, except in monthly returns. The predictable component of returns is about 5% in quarterly returns, about 10% in one-to-two-year returns, and about 30% in three-year returns indicating that the predictable variation tends to increase with the return horizon. Dividend yields are able to track expected nominal as well as real returns, both with and without dividends equally well. These results are quite similar to the findings in most other markets, particularly the U. S. market.

I. Introduction

There has been much attention in the finance literature on the ability of firm-specific variables to predict stocks returns. Prior Studies have found that ex-ante variables such as dividend yield, earnings-price ratio, leverage, firm-size, and book-to-market equity have some predictive power. See, for example, Stattman (1980), Reinganum (1981), Banz (1981), Rozeff (1984), Basu (1983), Bhandari (1988), Fama and French (1988a), Fama and French (1989), Ferson and Harvey (1991), and Fama and French (1992). While there has been some published work on the relationship between stock returns and firm-specific variables in the Sri Lankan market [for example, Samarakoon (1997), Nimal (1997)] the issue of the power of dividends to predict stock returns has not been investigated. Hence, the objective of this paper is to examine the relationship between stock returns and dividend yields in the Colombo Stock Exchange (CSE) with a view to fill this gap in literature and to enable comparison of results reported in the literature on the same issue in foreign stock markets.

The empirical results of this study show that dividend yields (DY) reliably predict expected stock returns in the CSE, except in monthly holding periods. Consistent with the findings of similar research in the U.S. market [for example, Fama and French (1998a), Fama and French (1989)], this
paper finds that the predictable component of returns is a small fraction of short-horizon return variances. Regressions of returns on DY explain about 5% of the variances of quarterly returns. The predictable component is found to be a larger fraction of long-horizon return variances. For example, the explanatory power is about 10% in one-to two-year return variances, and about 30% in three-year return variances. These results suggest that the Sri Lankan stock market, although small and relatively illiquid, is not different from the U.S. market in terms of the power of dividend yield to forecast expected returns.

The rest of the paper is organized as follows. Section II reviews major previous studies on the relationship between stock returns and dividend yields, as well as evidence on the predictability of stock returns in Sri Lanka. Section III discusses the model, while Section IV describes the variables employed in this paper. The results of the study are discussed in Section V. Finally, the conclusions are presented in Section VI.

II. Previous Studies

Prior studies show that short- and long-horizon stock returns are predictable through ex-ante dividend yield. Rozeff (1984), based on the constant dividend growth model, shows that current dividend yield on stocks approximately equals the equity risk premium. Using annual observations for the 1926-82 period, Rozeff provides evidence that ex-ante dividend yield is significantly related to realized (nominal) returns, and explains about 11% of return variation.

Fama and French (1988a) examine the power of the dividend-price ratio, (D/P), to forecast nominal and real returns on the NYSE value- and equal-weighted portfolios during the 1927-86 period. The reason for using D/P as the forecasting variable is that stock prices are low relative to dividends when expected returns are high, and vice versa, so that D/P varies with expecrer returns. They find that D/P explains about 5% of the variation in monthly returns, and more than 25% of the variation in two- to four-year returns. Thus, the power of D/P to forecast stock returns increases with the return horizon. Fama and French (1989) show that dividend yield, default spread and term spread track components of expected returns (nominal and real) of portfolios of bonds and the NYSE value-and equally-weighted portfolios of stocks. Dividend yield and default spread capture the time-variation in expected returns in response to business conditions.

1 The dividend yield, as used in Rozeff (1984), is called the dividend yield risk premium and is measured as the dividend yield multiplied by one plus the Treasury bill rate.
Ferson and Harvey (1991) provide international evidence on return predictability and hence evidence on time-variation of expected returns. They show that ex-ante dividend yield and term spread variables are significantly related to monthly excess returns in eighteen markets, although the predictive power is different across countries.²

There are numerous studies that show implications for the predictability of returns using the autocorrelation structure of returns. Although the present study employs ex-ante variables other than returns to capture the predictable component of returns, the findings of these studies are relevant in understanding return predictability. Fama and French (1988b) examine autocorrelations of long-horizon returns and find a U-shaped first-order autocorrelation pattern over increasing return horizons. The negative autocorrelations imply that stock prices contain a slowly decaying mean-reverting component. The predictable component of returns for portfolios of smaller firms is larger and in the order of 40% for 3-to-5-year return horizons. This is around 25% for portfolios of large firms. However, the strong negative autocorrelations of the 1926-85 period are largely due to the 1926-40 period. They conclude that if negative autocorrelations are due to time-varying expected returns, then it may not be an important phenomenon after 1940. Using a variance ratio test, Poterba and Summers (1988) find positive autocorrelations in monthly returns and negative autocorrelations in long-horizon returns. The evidence on mean-reversion is greater in the U.S. data prior to 1925 and in the equally weighted NYSE index returns. Also the mean-reversion is more pronounced in less broad-based and less sophisticated foreign markets.

Since the present study employs Sri Lankan data, it is important to review the existing evidence on the predictability of stocks returns in the CSE. Samarakoone (1996a) examines the autocorrelations of daily, weekly and monthly returns in the CSE in the 1985-1995 sample period using data for market and sector indices. The study finds significant autocorrelations in the order of 50 percent and R²'s of about 30 percent in the daily market returns for the 1991-1995 period. Strong evidence of predictability of monthly returns of sector indices is also found for the 1991-1995 period. The evidence rejects the random walk model of stock returns for the market indices and most sector indices. Hasan, Hasan, and Samarakoone (1999) find that market returns exhibit significantly positive skewness and kurtosis indicating that return distributions depart from normality. They also perform the Kolmogorov-Smirnov goodness-of-fit test to provide a non-parametric test of normality. The results show that daily returns do not follow a normal distribution.

Samarakoon (1998) examines long-horizon predictability of stock prices in Sri Lanka using one-to four-year real returns on indices for market and industry portfolios during the 1985-97 period. In a model of prices, which contains a random walk component and a slowly decaying transitory price component which are uncorrelated, the slope of regression of returns of certain period on lagged return of equal length measures the predictable variation of returns [See Fama and French (1998)]. The results show that, consistent with the prediction of the model and findings of previous research, long-horizon returns in Sri Lanka are highly negatively correlated implying mean reversion. Predictable variation in one-to three-year returns is very large in the order of about 50 percent. The results also reliably reject the random walk behavior of prices.

Samarakoon (1996b) investigates the relationship between stock returns and inflation in Sri Lanka using monthly and quarterly data for the period January 1985 to August 1996 with a view to providing empirical evidence on the generalized Fisher Hypothesis which states that nominal stock returns are positively related to expected inflation in a one to one correspondence. The results indicate that both lagged inflation and expected inflation are significantly positively related to stock returns in a manner predicted by the Fisher Hypothesis suggesting that stocks in Sri Lanka, different from evidence in most other countries including the U.S., are an effective hedge against expected inflation.

Premawardhana (1997) finds that weekly and monthly stock returns in Sri Lanka are positively related to contemporaneous and lagged 12-month Treasury bill yields during the 1990-95 period. He also shows that contemporaneous Treasury bill yield spread between 12-month and 3-month yields is reliably positively related to weekly and monthly stock returns, while lagged yield spread has a strong positive relation with weekly returns. Hasan and Samarakoon (2000) examine the ability of interest rates, as measured by Treasury bill rates of all three maturity periods, to track the expected monthly, quarterly and annual returns in the Sri Lankan stock market during the 1990-97 period. In contrast to the findings in most prior studies on foreign markets, the results of this study indicate that short-term interest rates in Sri Lanka are positively related to future returns. They are able to reliably track expected returns of all three return horizons. The effect of interest rates on future returns becomes larger and stronger with longer maturity Treasury bill yields, particularly in monthly and quarterly return horizons. In addition, the explanatory power also tends to increase with return horizon, except in annual returns. The Treasury bill yields explain up to 4%, 11% and 7% of monthly, quarterly, and annual future returns respectively. Of the three interest rate maturity periods considered, the 12-month yield is found to have the most power to track monthly and quarterly expected returns.
Samarakoon (1997) investigates the ability of market beta, book-to-market equity, leverage, and earnings-price ratio to explain the cross-sectional variation in expected returns in the small stock market of Sri Lanka. The results show that, inconsistent with the central prediction of the Capital Asset Pricing Model [Sharpe (1964),Lintner (1965), and Black (1972)], the relation between average returns and beta is strongly negative. Earnings-price ratio shows a reliable positive relation with average returns. Market beta and earnings-price are strongly related to returns jointly as well. Firm size, BE/ME, and leverage are not related to average returns in any significant manner. Nimal (1997) also reports similar results.

III. The Model

The hypothesis that dividend yields track expected returns has long been motivated by the constant dividend growth model of Gordon (1962). Under the assumptions that dividends grow at a constant rate g, and that the discount rate is the constant \( r \), the Gordon model equates the price at time \( t-1 \), \( P(t-1) \), to dividends in period from \( t-1 \) to \( t \), \( D(t) \), as given by equation (1).

\[
P(t-1) = \frac{D(t)}{r - g}
\]  

(1)

Then, the dividend yield becomes

\[
\frac{D(t)}{P(t-1)} = r - g
\]  

(2)

When the discount rate is high, then \( P(t-1) \) becomes low relative to \( D(t) \), making the dividend yield high. When the discount rate is low, then \( P(t-1) \) is high relative to \( D(t) \), making the dividend yield low. Thus, according to this model, the dividend yield is positively related to the discount rate and may capture the variation in expected returns [see Fama and French (1998a)]. In order to test the hypothesis that dividend yields track expected returns, a regression model of the following form is specified.

\[
R(t, t+T) = \alpha + \beta DY(t) + \varepsilon(t, t+T)
\]  

(3)

where,

\[
\begin{align*}
R(t, t+T) &= \text{the returns on the market index from time } t \text{ to } t+T, \\
\alpha &= \text{the intercept term of regression}, \\
\beta &= \text{the slope of regression}, \\
DY(t) &= \text{the dividend yield}, \\
\varepsilon(t, t+T) &= \text{the error term of regression}, \text{ and} \\
T &= \text{M (month), Q (quarter), 1 (year), 2 (2 years), or 3 (3 years)}.
\end{align*}
\]
IV. Definition of Variables

The market index is represented by the All Share Price Index (ASPI), which is the broadest index available on the Sri Lankan stock market. The ASPI is a value-weighted index (1985=100) and includes all stocks quoted in the CSE, which varied between 176 in 1989 and 239 in 1997. The changes in ASPI capture only the capital gains and do not include dividends. The basic series used is the continuously compounded monthly changes in ASPI. The sample period for return is 1989-1997 inclusive of both years. A total return series is constructed by adding monthly market dividend yield to the monthly capital gains yield. The monthly market dividend yield is defined as the aggregate of the dividends paid by all listed firms during month t divided by the aggregate of the market capitalizations of all listed firms at t-1. Using monthly return observations, monthly overlapping returns are formed for quarterly, one-year, two-year, and three-year holding periods.

The market dividend yield, DY(t), is computed by using the aggregate dividends paid by all listed firms in the year preceding t, divided by the aggregate market capitalization as at time t-1. In other words, DY(t) is defined as D(t)/P(t-1). As pointed out in Fama and French (1998a), this definition of yield is more conservative and is likely to avoid false positive conclusion that yields track expected returns. The source for the index and dividends data is the CSE.

The nominal returns have been converted into real returns, by the use of the Colombo Consumer Price Index, which is the key price index in Sri Lanka. The regressions are estimated on both nominal and real returns, with and without dividends. The Ordinary Least Squares regression results indicated a problem of positively autocorrelated residuals. The Durbin-Watson statistic was used to detect the problem of residual autocorrelations. Therefore, the regressions are estimated by the Generalized Least Squares (GLS) in order to correct for the problem of autocorrelated disturbances.

V. Regression Results

Summary statistics on returns and dividend yields are shown in Table 1. The average monthly return with dividends is 1.6% with a standard deviation of 7.7%. The average quarterly return with dividends is 4.7% with a standard deviation of 15.6% while the average annual return with dividends is 18.8% with a standard deviation of 43%. The standard deviations of real returns are not much different from those of nominal returns suggesting that inflation does not have the effect of increasing the volatility of returns. As a result, the results of regressions that employ nominal returns are not materially different from those using real returns.
Table 2 presents results of regressions of returns on dividend yields. Except for monthly return horizons, ex-ante annual dividend yield is found to be a reliable predictor of future returns. Consistent with the predictions of the model, all the regression slopes are positive. The slopes of regressions that use nominal returns, except in monthly return intervals, are all significant at 1%. In regressions that employ real returns, slopes for quarterly returns are significant at 5%, while slopes for longer return horizons are significant at 1%. This evidence provides very strong support to the hypothesis that dividend yields track expected stock returns in Sri Lanka.

There is also a tendency for slopes to increase with the return horizon, except in the two-year regressions. Fama and French (1988a) also report similar findings in the U.S. market. The slopes of quarterly returns are 7 to 8 times larger than the slopes of monthly return horizons, and hence are more than proportional to T indicating that variation in DY(t) signals more variation in quarterly expected returns. However, slopes of one-year returns are only about twice as large as slopes of quarterly returns, and less proportional to T. The slopes of two-year returns are slightly less than those of one-year returns. As suggested by Fama and French (1998a) the behavior of slopes of one- and two-year returns may be interpreted as DY(t) signaling less variation in expected returns of distant return horizons.

The magnitude and pattern of slopes are not very different between nominal and real returns. This indicates that dividend yields have the ability to track the variation in expected nominal returns as well as expected real returns equally. Another interesting observation is that dividend yields are able to predict returns without dividends as much as it predicts returns with dividends. The slope coefficients between regressions with dividends and without dividends are quite similar.

The results of regressions also indicate that about 5% of the variation of quarterly nominal returns is explained by ex-ante annual dividend yields. The explanatory power increases to 11% in one-year returns, and declines to 9% in two-year return horizons. However, the $R^2$ increases again to 31% in three-year return intervals. While strong interpretations cannot be made due to the small number of observations and the short sample period, this suggests that dividend yields can track distant expected returns as well. The pattern of $R^2$'s across return horizons is similar in regressions that use real returns, although they are slightly smaller.
Table 1

Summary Statistics on Returns and Dividend Yields

Returns are continuously compounded returns for non-overlapping monthly, quarterly, and annual time periods. Real returns are calculated by adjusting nominal returns for the changes in the Colombo Consumer Price Index (CCPI). \( \text{DY}(t) \) is the dividend for the year preceding time \( t \) divided by the price at time \( t-1 \). \( N \) is the number of observations.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Returns with Dividends</th>
<th>Returns without Dividends</th>
<th>( \text{DY}() )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nominal</td>
<td>Real</td>
<td>Nominal</td>
</tr>
<tr>
<td><strong>Monthly (( N=108 ))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.6</td>
<td>0.6</td>
<td>1.3</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>7.7</td>
<td>7.8</td>
<td>7.7</td>
</tr>
<tr>
<td>Maximum</td>
<td>31.5</td>
<td>30.1</td>
<td>31.0</td>
</tr>
<tr>
<td>Minimum</td>
<td>-16.7</td>
<td>-16.5</td>
<td>-16.7</td>
</tr>
<tr>
<td><strong>Quarterly (( N=36 ))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>4.7</td>
<td>1.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>15.6</td>
<td>16.1</td>
<td>15.6</td>
</tr>
<tr>
<td>Maximum</td>
<td>44.5</td>
<td>40.0</td>
<td>43.6</td>
</tr>
<tr>
<td>Minimum</td>
<td>-18.8</td>
<td>-23.8</td>
<td>-19.2</td>
</tr>
<tr>
<td><strong>Annual (( N=9 ))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>18.8</td>
<td>7.2</td>
<td>15.8</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>43.0</td>
<td>42.8</td>
<td>43.2</td>
</tr>
<tr>
<td>Maximum</td>
<td>79.7</td>
<td>71.1</td>
<td>77.9</td>
</tr>
<tr>
<td>Minimum</td>
<td>-35.8</td>
<td>-46.7</td>
<td>-39.7</td>
</tr>
</tbody>
</table>
Table 2

Regressions of Stock Returns on Dividend Yields

R(t, t+T) is the continuously compounded returns from time t to t+T, where T is equal to one month (M), one quarter (Q), one Year (1), two years (2), or three years (3). Real returns are calculated by adjusting the nominal returns for changes in the Colombo Consumer Price Index (CCPI). The regressions beyond monthly return horizon use overlapping monthly returns. DY(t) is the dividend for the year preceding time t divided by the price at time t-1. N is the number of observations. R^2 is the coefficient of determination adjusted for degrees of freedom. β is the GLS slope adjusted for the autocorrelated residuals.

<table>
<thead>
<tr>
<th>Return Horizon (T)</th>
<th>N</th>
<th>Returns with Dividends</th>
<th>Returns without Dividends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>β</td>
<td>t(β)</td>
</tr>
<tr>
<td>M</td>
<td>108</td>
<td>0.91</td>
<td>1.11</td>
</tr>
<tr>
<td>Q</td>
<td>106</td>
<td>6.15</td>
<td>2.63*</td>
</tr>
<tr>
<td>1</td>
<td>97</td>
<td>11.16</td>
<td>3.57*</td>
</tr>
<tr>
<td>2</td>
<td>85</td>
<td>10.04</td>
<td>2.89*</td>
</tr>
<tr>
<td>3</td>
<td>73</td>
<td>26.58</td>
<td>5.75*</td>
</tr>
</tbody>
</table>

Panel B: Real Returns

<table>
<thead>
<tr>
<th>Return Horizon (T)</th>
<th>N</th>
<th>β</th>
<th>t(β)</th>
<th>R^2</th>
<th>β</th>
<th>t(β)</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>108</td>
<td>0.74</td>
<td>1.12</td>
<td>-0.01</td>
<td>0.73</td>
<td>0.65</td>
<td>-0.01</td>
</tr>
<tr>
<td>Q</td>
<td>106</td>
<td>5.84</td>
<td>2.40*</td>
<td>0.05</td>
<td>6.05</td>
<td>2.43*</td>
<td>0.04</td>
</tr>
<tr>
<td>1</td>
<td>97</td>
<td>11.08</td>
<td>3.47*</td>
<td>0.10</td>
<td>11.34</td>
<td>3.59*</td>
<td>0.10</td>
</tr>
<tr>
<td>2</td>
<td>85</td>
<td>10.38</td>
<td>2.93*</td>
<td>0.08</td>
<td>10.65</td>
<td>3.05*</td>
<td>0.08</td>
</tr>
<tr>
<td>3</td>
<td>73</td>
<td>25.68</td>
<td>5.49*</td>
<td>0.28</td>
<td>26.63</td>
<td>5.53*</td>
<td>0.28</td>
</tr>
</tbody>
</table>

a Significant at 1%
b Significant at 5%
VI. Conclusions

This paper investigated the ability of dividend yields to predict expected stock returns in the Colombo Stock Exchange. The paper finds that dividend yields predict expected returns reliably in return horizons up to three years, except in monthly returns. The predictable component of returns is about 5% in quarterly returns, about 10% in one-to two-year returns, and about 30% in three-year returns. Thus, the predictable variation tends to increase with the return horizon. Dividend yields are able to track expected nominal as well as real returns, both with and without dividends equally well.

These results are quite similar to the findings in most other markets, particularly the U.S market, despite wide differences in terms of the level of sophistication, size, liquidity etc. The findings of this paper add to prior studies on the Sri Lankan market, which show predictability on the basis of short- horizon and long-horizon autocorrelation of returns, as well as through macro-economic variables such as inflation and interest rates.

Finally, a caveat is in order. The results of this study are based on a nine-year sample period, which is much shorter than sample periods used by prior research on the U.S. market. Therefore, caution needs to be exercised in making strong inferences from the results reported.

References


Rozeff, Michael, 1984, Dividend yields are equity risk premium, *Journal of Portfolio Management* Fall, 68-75.


